A SHORT OUTLINE OF MODERN TACTICS

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BY

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FOREWORD

It requires a certain amount of courage to write about tactics, for two reasons. The first is that judging by past experience all writers on tactics, both official and unofficial, have invariably been proved wrong in their deductions by the course of ensuing campaigns. The second is that in these days of bewilderingly rapid changes in organisation and doctrine, any work is liable to become out of date between the time that it is written and the time that it is printed.

As regards looking into the future, I can only comfort myself with the thought that every rule requires an exception to prove it. To avoid becoming dated, I have tried to keep to broad lines, and to form deductions that will not be affected by minor changes in organisation.

This volume is not, of course, intended to be in any way an exhaustive treatise. It merely attempts to outline to what extent the latest developments in armaments and doctrine are likely to influence future warfare.

I can, however, claim that it is the result of a good deal of thought, and is based on a fairly wide experience in commanding and training troops in war and peace.

A. B. BEAUMAN,
Brigadier-General.

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A SHORT OUTLINE OF MODERN TACTICS

CHAPTER I

General Tendencies

Progress in armaments and tactical doctrine is normally governed by the experience gained in war. Since 1918 there have been no wars between first-class military powers; and as a result no conclusive deductions based on actual experience can be made, although useful lessons may be extracted from the Italian-Abyssinian campaign, the Japan-China conflict, and especially the civil war in Spain. In the latter case, although the troops engaged cannot be rated highly, both sides have received help in the way of the most modern war equipment from powerful militaristic nations, and therefore the lessons of the campaign, although by no means conclusive, certainly deserve careful study.

In the absence of the real test of a war between first-class armies, all nations have to a certain extent based their organisation, armament, and doctrine on the theory and the experience of peace training. In every case certain general tendencies can be traced. The most important may be summarised as follows :

(*a*) An attempt to find some method which will enable an attack to succeed against the combined defensive power of trenches, automatic weapons,[1] and barbed wire.

(*b*) The recognition that air forces are bound to have an ever-increasing effect on land operations.

(*c*) A search for the best means of utilising mechanical vehicles, not only for transport services, but also on the battlefield.

There can be no doubt that the general effect of modern invention has been to increase the power of the defence at the expense of that of the attack. The first warnings of this situation were apparent in the Russo-Japanese War, and were amply confirmed by the experience of the Great War. The chief factors that produced this new situation were, of course, the combination of automatic weapons, barbed wire, and field fortifications. This combination set up a defensive wall against which all the best troops in Europe battered their heads with meagre results only obtained at the cost of hitherto unheard-of casualties. All the best brains in Europe concentrated on finding a solution to this problem. Many methods were tried and found wanting. The concentration of an enormous mass of artillery was at one time considered to offer a solution. But this method on the whole proved unsatisfactory. The amount of shell power necessary to demolish even a moderate length of barbed wire obstacle, or to keep silent a few well-dug-in machine-gun posts, exceeded all calculations. Many attacks proved costly failures, while such successes as were gained usually proved strictly limited. The reasons were not far to seek. It required weeks or even months to collect the amount of artillery and ammunition required to support an attack on even a moderately broad front. As a result the enemy became well aware that an attack was impending. Defences were deepened and reserves were concentrated in suitable areas for counter-attack. When after a terrific deluge of shells the attack actually took place, the attackers sometimes found the early stages of the advance fairly easy. Except where elaborate permanent defences of the concrete type exist, the defences of a given area can always be pulverised if sufficient weight of artillery can be brought to bear. But as soon as the attackers advanced beyond the area that had borne the full weight of the artillery bombardment, untouched defences, uncut barbed wire, automatic weapons, and counter-attacks by fresh troops soon broke the impetus of the attack and eventually brought it to a standstill. As the moving forward of the mass of artillery and ammunition necessary to render possible a further advance under these conditions takes a considerable time, it is obvious that making ground by these methods is bound to be slow and costly in casualties, and can only be defended if the despairing policy of a war of attrition is accepted. The casualties inseparable from such a policy are bound to make it inacceptable to any country which values public opinion.

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[1] The term automatic weapons is used throughout to cover machine guns, light machine guns, and light automatics.

As the Great War progressed, the appearance of a new tactical weapon, the tank, promised to give the attack a reasonable chance of success without undue casualties. It was responsible for some striking tactical successes, but owing to lack of faith in its battle-winning properties by the High Command, difficulties of manufacture, and the inherent mechanical defects in a new and complicated fighting machine, it was never delivered on the battlefield in sufficient quantity or quality to have a decisive effect on a big scale. It had at that time the great advantage that prolonged research on counter measures had not been possible. The interval since 1918 has, of course, provided this opportunity, and the age-old contest between armour and projective has recommenced. Efficient quick-firing weapons with high muzzle velocity firing special armour-piercing projectiles have been evolved. Anti-tank mines capable of crippling tanks are easy to manufacture in large quantities. The tank, on the other hand, has increased in general mechanical efficiency; in speed and manœuvring power in the lighter types, and in projectile-proof armour in the heavier. Until actually tried out on the battlefield it is difficult to say definitely if the anti-tank weapons have made greater progress in efficiency than the tanks themselves. It is doubtless possible to manufacture tanks sufficiently highly armoured to resist most anti-tank weapons. But such vehicles have, owing to their weight, distinct limitations as regards cross-country performance, especially on boggy ground, and they would also be unable to cross any but the heaviest military bridges. The cost and difficulty of manufacture would also limit their numbers in peace and in the early stages of a war.

It must be remembered that all tanks are extremely sensitive to ground conditions, and that any force contemplating a defensive policy against an enemy strong in tanks is certain to take this factor into account. It is, therefore, probable that in the future defensive positions will be chosen primarily from the point of view of invulnerability to tank attacks. Even a small stream with a muddy bottom, if under sufficiently close fire to prevent troops unprotected by armour from constructing tank crossings, can prove an unsurmountable obstacle to tanks. Boggy ground, railway cuttings and embankments, deep ravines running parallel to the position, are other obstacles that may prove tank proof. It is, of course, often impossible in an extended defensive position, unless closely following a river line, to ensure natural tank obstacles along the whole front. But natural obstacles will limit the danger of the massed tank attack to certain sectors, and vulnerable sectors can be partially protected by mine fields.

In view of the difficulties of direct attack under modern conditions all nations have been studying and practising the possibilities of the wide turning movement by fast-moving and completely mechanised forces consisting of tanks, armoured cars, artillery, and troops carried in mechanical transport. While such an operation under favourable circumstances may achieve striking results, there are certain difficulties and risks that become apparent on closer examination. This question is studied in detail in a later chapter.

A factor which, although not new, may have considerable influence on future wars is the use of gas. Its use is, of course, prohibited by international agreement, but there is no certainty that this prohibition will be respected by nations engaged in a life-and-death struggle. It must be remembered, however, that it is a two-edged weapon and nations may, under certain circumstances, refrain from its use from the point of view of expediency rather than altruism. Its use is likely to favour those nations with the greatest industrial resources. It was used, in defiance of international agreement, by the Italians in Abyssinia with devastating effect, and undoubtedly brought them a quicker victory than would otherwise have been possible. But despite various allegations probably put forward for propaganda purposes, there is no reliable evidence as yet that it has been used by either side in the Spanish Civil War or the Japanese campaign in China. In the Great War gas was used mostly as an offensive weapon. When first used it had the great advantage of surprise, but even against troops totally unequipped to meet it, it never brought more than strictly limited and local tactical success. Since the Great War all nations have devoted a considerable amount of research and study to the problem of gas warfare. Unless greater secrecy than is usually possible in such matters has been achieved, it does not appear that any striking discoveries have been made in the way of new types of gas. On the other hand, considerable progress has been made in devising protective measures against gas, and although these measures lessen mobility, there seems no reason to expect that a well-equipped and well-disciplined army will suffer many casualties from this source. The net result of this progress in anti-gas measures is that gas is likely to become a defensive rather than an offensive weapon. The attacking force always wishes to retain the maximum mobility, and will usually be averse from contaminating areas over which its own troops are likely to pass. The necessary protective measures in the shape of anti-gas clothing and gas masks are bound to take the dash out of an attack, and even the occupants of armoured fighting vehicles, while not so sensitive to gas as dismounted personnel, have to take certain precautions which lessen their fighting efficiency. Gas may, however, be used as a subsidiary method of helping an attack by neutralising areas on a flank, hindering artillery fire, or interfering with the movement of reserves well behind the fighting area. In such cases it will probably be projected by aeroplanes or artillery.

As mobility is not so important (except as regards the movements of reserves) to the defence as to the attack, the use of gas to slow up the momentum of an attack may become important. The defence is, however, handicapped by the fact that it seldom knows for certain the exact area chosen for attack, and therefore may not have the necessary gas cylinders or shells in the right place at the right time. Aeroplanes capable of ejecting gas can be quickly directed to any area within a wide radius, however, and may often be effective in use against an attack.

Probably the most important defensive use of gas will be in covering a retirement. Areas can be contaminated with ease and safety by the retiring force, and the effect will undoubtedly be to slow up any troops trying to follow, however complete their anti-gas equipment and training.

The effect of gas against uncivilised or semi-civilised nations will, of course, always be devastating, and should ensure decisive success for those armies who are willing to use it in such circumstances.

The use of smoke-producing projectiles, fired either by artillery or mortars, has been greatly developed of late years. This development undoubtedly favours the attack, as good visibility is necessary to enable the defence to bring aimed fire on the attacking troops and armoured fighting vehicles. But it must be remembered that smoke by itself does not stop fire, and the machine guns and artillery of the defence will almost certainly have most lines of approach covered by fixed lines of fire. Fire of this type, though not so effective as aimed fire against a visible enemy, may prove impassable to dismounted troops, but is not likely to stop armoured fighting vehicles. Smoke is, moreover, to some extent a double-edged weapon as it makes control difficult, and troops passing through are liable to lose cohesion and direction. It also makes it difficult for tanks to avoid obstacles. Its use requires a considerable amount of skill and judgment, but used in the right way and at the right time it must undoubtedly be classified as an important asset to the attack.

Considerable progress has been made of late years in perfecting the methods of predicted shooting by artillery. These methods enable an unlimited number of guns to open accurate fire on selected enemy positions without previous registration, or after registration by a strictly limited number of guns. Formidable artillery fire can therefore be made available to support an attack without that prolonged and promiscuous registration, which in former days gave the enemy ample warning that an attack was imminent. But it must be remembered that registration is only one of the warning signs which artillery give to the enemy before an attack. The concentration of an exceptional number of guns and the necessary ammunition for a really heavy and prolonged bombardment is unlikely to remain hidden from an enemy for long, unless his intelligence service is poor and his air forces have been prevented from carrying out effective reconnaissance.

The influence of the air forces on ground operations is bound to be of increasing importance. During the early and middle stages of the Great War, air reconnaissance had an important effect on operations, while in the later stages, attacks on rest areas, communications, and reserves were developed with varying degrees of success. The great increase in the strength of the air forces of all civilised nations and the constant advance in performance of the various types of aircraft makes it certain that the menace from the air will profoundly affect all ground movement in future. While it is certain that a considerable proportion of these air forces will be used for attacks on the political and industrial objectives in the enemy territory, it is equally certain that powerful air formations will be retained for action in co-operation with the land forces.

The most important development in the use of air forces in such circumstances is their employment in close support of forward troops in attacks and defence. This new factor appears certain to have an increasing influence on ground operations, and to become a normal feature in modern warfare. In the Spanish operations the technique of air support for the attacking troops has been fully developed, and there is little doubt that most of the striking tactical successes gained by the Nationalists have been due to the material and moral effect produced by vigorous and persistent low flying attacks on the opposing defences.

Such attacks appear to have been carried out without undue casualties amongst the attacking planes.

As an attacking weapon the airplane has many advantages. Owing to their range, a considerable mass of aircraft can be concentrated within reach of the area selected for attack without giving any certain indication to the enemy of the impending blow. Projectiles from the air (either bombs or machine-gun bullets) having a more or less vertical trajectory towards their target are likely to have a much more devastating effect on the occupants of trenches than similar projectiles fired from the ground. Considerable time, material, and skilled labour are required to construct overhead cover that is proof against bullets and light bombs, and therefore only permanent or semi-permanent defences can be protected from this type of attack.

Observers in Spain have not only been impressed by the casualties caused by low flying attacks, but also by their moral effect. It can well be believed that a hail of bombs and bullets from the air, delivered by several successive waves of low-flying planes, is likely to strain the nerves of even the most steadfast troops and render them less resistent to the ensuing ground attack.

After careful consideration of the evidence from Spain and the many obvious advantages of this form of support for the attack, there can be little doubt that this development in battle tactics has come to stay and is likely to assume increasing importance. Nations that are equipped with the suitable machines and have practised the necessary tactics are likely to be at a considerable advantage at the beginning of a campaign. So far, the British Army has shown little sign of adapting itself to this new development in tactics. It is to be hoped that this omission to profit by the experience of others will be repaired in the near future.

While a new task has become clearly indicated for the air forces supporting ground operations, the old tasks retain their former importance. There is no need to stress the value of air reconnaissance. For many years it has been recognised that a field army that cannot maintain a regular and efficient air reconnaissance service is severely handicapped in modern war. Air attacks on the communications of opposing armies are also a routine duty of air forces. But judging from accounts from Spain, in spite of the number and power of bomber planes that have been employed, it appears that the effect of such attacks are not likely to be as paralysing as anticipated. In spite of undoubted air superiority, and persistent attacks by formidable air forces, the Nationalists in Spain never appear to have inflicted a serious or long continued breakdown on the Republican communications. Perhaps the most illuminating instance is the failure of the Nationalist air force to break down the communications over the River Ebro during the late summer and autumn of 1938. In this instance the Republican Army, having gained a precarious footing on the right bank of the Ebro, were dependent on temporary bridges over a wide and swift-running river for the supply of their forces. In spite of persistent air attacks by the Nationalists, the Republican supply services managed to keep up a regular flow of food, ammunition, and material to their forward troops over a period of several months. An extract from a recent report by a *Times* correspondent in Spain on those operations is of interest: " Only one in every 3000 bombs aimed at the bridges and ferries made a direct hit, it is affirmed. In repeated attacks on the main bridge system it was found that even a direct hit meant damage that could be repaired after nightfall."

Nationalist air attacks on their opponent's communications farther in rear of the fighting-line do not appear to have achieved more than temporary success. The vital road and railway communications between Barcelona and the French frontier have never been interrupted for any length of time, whilst the seaports of Republican Spain have continued to function in spite of persistent air attack. Similarly, the Japanese air forces, although enjoying an unchallenged air supremacy, have found great difficulty in interfering seriously with the Chinese railway communications. While it is easy to exaggerate the effect of air action on communications, it is certainly dangerous to ignore it. It would undoubtedly be hazardous to rely for the supply of any considerable body of troops on single communications with vulnerable bottle-necks such as bridges, etc. Alternative lines of communication are a necessary insurance in modern war if the danger of complete loss of mobility owing to a breakdown in supply is to be avoided. All civilised armies are now dependent on a mass of petrol-driven vehicles for their mobility, and while horses can live on most types of country at a pinch, and troops can live on half rations, or less, for short periods without noticeable loss of efficiency, a petrol-driven vehicle must have its full ration of fuel and oil or else become a useless hulk of metal. But roads and tracks passable to M.T. are usually far more numerous than railways, and provided there is no bottle-neck on the channel of supply, alternative routes can usually be found. Air attack can put railways out of action more easily and for longer periods than roads, so it would seem that the army that relies more on roads than on rail is the less likely to be seriously inconvenienced by air attacks on its communications. Judging by contemporary experience it appears probable that sea bases, provided they are adequately protected by anti-aircraft batteries and air formations, can be expected to carry on their normal functions without serious or prolonged dislocation. But here again it may be dangerous to be too optimistic, and it would certainly be advisable to have several alternative sea bases for a large force operating overseas.

An entirely new element has been introduced into modern warfare by those vast permanent defensive lines that have sprung up along various European frontiers during recent years. These lines, which have taken years to construct and which are planned on the most scientific lines, are claimed to be shell proof, tank proof, gas proof, and bomb proof. All approaches can be swept by heavy fire from weapons controlled by personnel who are immune from any known form of projectile. Not only have these lines continuous linear strength, with their flanks resting on natural obstacles or frontiers of probable neutrals, but they are of considerable depth.

It is a curious fact that although the existence of these lines has been well known for several years, they have been completely ignored in official textbooks and instructions. No indication is given as to what action should or might be taken by an army whose advance is blocked by such an obstacle. It is probable that no answer to this problem exists, and that it is realised that unless many lives are to be wasted uselessly in attempting to force a line impregnable to any weapon carried by a field army or air force, stalemate is inevitable. In this case the offensive can only be carried on by air forces operating against objectives behind the enemy lines, or by attempting to turn the lines by a sea landing if the enemy has an open coast. In the first case there is no evidence at present that an air offensive unsupported by ground action is likely to lead to decisive results, while the perils attending the landing and maintenance of a large force without proper harbour facilities were well exemplified in the Gallipoli campaign. The capture of a port provided with modern defences by direct attack is probably not a practical proposition in modern war.

Having reviewed the main changes in tactics and armaments during the last twenty years, it may be well asked whether these changes have altered the balance in favour of the attack or the defence. The following factors may be considered to favour the attack :

(1) Improved performance and armament of tanks.
(2) Development of the close support air attack.
(3) Use of smoke projected by tanks, artillery, or mortars.
(4) Development of predicted artillery fire.
(5) Use of M.T. for rapid movement of troops.

The defence has been strengthened to the following extent :

(1) Improved anti-tank weapons.
(2) Improved anti-aircraft weapons.
(3) The defensive use of gas (for those nations who are prepared to disregard the convention against its use).
(4) Increase in the number and efficiency of automatic weapons.

It appears that in modern warfare an attack requires the following conditions in order to have a chance of decisive success :

(1) Surprise.
(2) A considerable mass of supporting tanks (sufficient to carry on the impetus of the attack in spite of inevitable casualties from A/T weapons and A/T mines).
(3) A considerable volume of supporting artillery fire, using smoke and predicted fire methods. (An attempt to concentrate too large a force of artillery will probably nullify surprise.)

(4) Persistent support from low-flying aircraft.
(5) Well-trained infantry capable of taking advantage of infiltration tactics.

If owing to obstacles the use of tanks is impossible, it may still be possible to gain success by intensifying other forms of support, particularly that from the air.

While an attack launched under the above conditions should in many circumstances have a good chance of success against field defences, it is not suggested that it would make any progress against permanent defences of the Maginot Line type. As far as can be foreseen, no type of attack would have any chance against such defences. This may be a policy of despair, but it is doubtful if any government or any responsible commander would be willing to risk the casualties and almost certain failure which would attend such an operation.

Speaking generally, it cannot be said that recent developments have favoured the attack more than the defence. When all is said and done, trenches, barbed wire, and automatic weapons have lost little of their value. Although the Nationalists in Spain have gained many striking tactical successes, the civil war still goes on, and a Nationalist army has been sitting in front of the trench lines of Madrid for over two years. A recent article in *The Times* from one of their correspondents in Spain sums up the situation as follows: " The one great general lesson dictated by the Spanish War is the immense defensive power of infantry provided with modern firearms against the heaviest concentration of bomb and shell."

CHAPTER II

THE OFFENSIVE—GENERAL CONSIDERATIONS

OFFENSIVES may be roughly classified as follows: those which it is intended to carry through without pause until a decision is reached, and those which are limited as to their final objective and are only intended as a phase in the plan for ultimate victory. Before modern armaments and the size of modern armies introduced fresh complexities into war, campaigns were often decided by one battle; there was only one major battle in the Waterloo campaign, and after it was fought the French army was quite incapable of serious resistance. But the great delaying power of modern weapons has made it more and more difficult to obtain a decision by one operation or closely related series of operations. Allenby's final offensive in Palestine certainly achieved decisive success; but although these operations were admittedly brilliant both in conception and execution, they were carried out against an enemy who was greatly inferior, not only in numbers but in every type of armament, and whose weakness in the air rendered him an easy prey to surprise attack. On the Western front, where the forces were more equal, although both sides obtained striking tactical successes on a large scale, neither side was ever able to claim a final decision. When the Armistice came the German armies were by no means incapable of further resistance, while the Allied armies were finding it more and more difficult to keep up the momentum of attack owing to supply difficulties. It may be said that no decisive battle was ever fought on the Western front.

The two main factors which make a "break through" so difficult in modern war are, firstly, the comparative ease with which a small force, with the aid of automatic weapons and modern methods of demolition, can delay a much larger one; and secondly, the difficulty of keeping a pursuing force supplied with the many stores (including petrol) required by any portion of a modern army. These two factors have become accentuated during the last twenty years. All armies have increased their proportion of automatic small arms, the technique of speedy demolitions has been improved, and armies have become more dependent on petrol and other heavy supplies. It is true that Spanish Nationalists achieved a break through that nearly proved decisive when they attacked astride the River Ebro during the early summer of 1938; but in this case their attack was delivered against a thinly held line with little defensive depth and few reserves. Even then the pursuit could not reach a really decisive objective such as Barcelona before the defensive line was reformed. Since then the Republicans have learned their lesson, and defence in depth on modern lines has made further Nationalist progress slow and costly.

Generally speaking, it appears that in spite of the increased mobility conferred by modern transport, it is likely that in the future, in operations between well-equipped armies of anything like equal strength, a decisive result is unlikely to be obtained by one battle or closely related series of operations during the early stages of a campaign. There is, of course, the possibility that a successful turning movement by large mechanised mobile forces may bring about the desired result. Some of the difficulties of such an operation will be discussed later.

It is, however, probable that if a commander can deliver a series of successful blows with limited objectives, he may succeed in so demoralising and disorganising the opposing forces that an attempt to force a final decision by a break through may eventually become justifiable. The pauses between the successive attacks will vary considerably with the size of the forces engaged; they may be a matter of days, weeks, or months. Although mechanisation has made the speedy concentration of reserves of infantry, artillery, etc., comparatively easy, and tanks and aircraft have lessened the need for the collection of vast masses of artillery ammunition, the amount of warlike stores required for an offensive with even a limited objective is still considerable.

It may be argued that a series of limited attacks constitutes a counsel of despair, and takes us back to the old methods of static warfare, which proved so unsatisfactory and costly in casualties. It will, of course, be the object of a commander who has sufficient superiority in resources at his disposal to prevent the situation becoming stabilised, and to keep up a more or less continuous offensive until he has obtained a final decision. But unless the superiority in morale and resources is very marked, it is difficult to foresee how the continuous offensive can be maintained against the undoubted power of modern defensive weapons, unless the mobile mechanised forces are going to have a much greater effect on operations than appears probable.

The policy of a series of limited offensives has some definite advantages. It has been abundantly proved by experience in all modern wars that the early stages of an offensive, if even partial surprise can be attained, are comparatively easy; the attacking force usually suffers few casualties, while the defenders suffer heavily. As soon, however, as the defending commander has had time to collect reserves, and the attacking force has lost the advantage of surprise, the positions are reversed. The heavy casualties suffered by the attack in most battles in the Great War are directly attributable to the fact that an attempt was made to maintain the offensive long after it had any real chance of success. Two examples from Spain may also be quoted to illustrate this point. The Nationalist attack astride the Ebro in the early summer of 1938 was brilliantly successful in its opening stages, and a considerable advance was made at a very slight cost. Having obtained a footing on the coast, an attempt was made to exploit the success gained by advancing eastward on Barcelona and south-westward on Valencia. Handicapped by the lack of any element of surprise and poor communications, both these offensives were soon checked by Republican reserves. The advance against Barcelona was not persevered with, but that against Valencia was pressed for several months. The result was an extremely slow advance which, after very heavy casualties, was eventually brought to a standstill without the capture of any objective of importance. A successful example of the limited objective attack is afforded by the Republican counter-offensive westward over the Ebro. This attack achieved surprise, and a considerable area of ground of strategic importance was gained at trifling cost. As soon as further advance became difficult owing to the arrival of enemy reserves and aircraft, the attacking troops dug in. It is true that after costly counter-attacks lasting several months the Nationalists succeeded in regaining the lost ground, but the Republican withdrawal appears to have been orderly and comparatively inexpensive. The operation as a whole succeeded in its object, *i.e.* for a period it completely upset the Nationalist plan of campaign.

Provided that the opening battles of a campaign are indecisive, as it is more than probable that they will be, it is possible that a series of successful blows with limited objectives will so reduce the fighting power and resistance of one side that a decisive break through becomes possible. It would appear that the essentials for the success of such an operation are an objective, or objectives, the loss of which would have a paralysing effect on the field armies of the enemy, sufficient mobile forces to maintain an unbroken offensive until their capture is achieved, and sufficiently good communications to maintain these forces with the necessary stores. The most likely objectives are vital points on the enemy communications, such as railway junctions or the road and railway bridges over a river on a fairly broad front. Unless the blow is swift, and the advance on the objective continuously pressed, there is grave danger that the enemy will be able to re-form a front too strong for the mobile forces to tackle before the objective is reached. In this case the mobile forces may find themselves in a dangerous salient from which extrication may become difficult, or even disastrous. For such an operation air superiority would be an essential factor. Intensive attacks on enemy aerodromes should limit enemy air interference with the mobile forces, while movement of enemy reserves towards the area of operations should be considerably delayed by persistent attacks from the air.

It would, of course, be necessary to start the operation by a surprise tank and infantry attack with strong artillery and air support. As soon as a sufficiently deep rupture had been achieved in the enemy defences, the mobile forces would pour through and continue their advance to their objectives with as little delay as possible. They could be followed by motorised infantry, who would take over successive natural obstacles when captured and safeguard the communications of the mobile forces.

The above would appear to be a possible method of achieving decisive success under favourable conditions. But it is recognised that it could only be achieved against an army greatly inferior in fighting resources or else against one seriously weakened by a series of previous reverses.

It must be admitted that it is quite possible that some wars in the future will not be decided by land campaigns at all, but in the air, on the sea, or by economic factors. The growth of permanent frontier fortifications certainly makes this a possibility. But if a land campaign, unimpeded by permanent fortifications, is carried to a conclusion before air, naval, or economic pressure has produced a decision, its course may take the following sequence. Firstly, an opening battle when the main armies clash. This will probably be largely indecisive, although one side may achieve a considerable advantage. Secondly, a period of semi-static warfare, during which one side may, by a series of successful attacks with limited objectives, reduce the other to a definite state of inferiority. Thirdly, an attack followed by a break through by mobile forces strongly supported from the air, which by capturing vital objectives behind the enemy field armies, will lead to their disintegration.

CHAPTER III

The Opening Phases of the Campaign

The declaration of war is certain to be the signal for the commencement of an intense air campaign by the opposing air forces. While superiority in the air can be obtained by superior armament and skill, complete mastery of the air is probably unattainable by one side even if the two air forces are very unevenly matched. Mastery of the sea can be obtained by a superior navy, but in naval warfare operations can only take place on one surface, while the air gives practically unlimited scope for avoiding an engagement. Even the Japanese, with a powerful, well-organised, and well-trained air force have found it impossible to prevent sporadic offensive action by the hastily improvised air forces at the disposal of the Chinese Government. The same has happened in Spain, where the Nationalists, although they have undoubtedly achieved superiority in the air, have never obtained complete mastery.

While air fighting will undoubtedly take place at the beginning of a campaign, it is doubtful if big air battles, fought as a trial of strength, will result. Fighting will more likely develop as the raiding squadrons heading for, or returning from, important objectives are attacked by intercepting air forces. It is only intended, however, to examine the probable action of air forces as it may affect the campaign on the ground.

The most likely military targets for bombing attack during the opening days of a war are aerodromes, important mobilisation centres, railway communications and, if troops are likely to be moved by sea, ports necessary for embarkation and disembarkation. In addition, it is probable that in most cases heavy attacks would be made on capitals and industrial centres with a view to interfering with the normal functions of government, the manufacture of munitions of war, and the morale of the civil population. It is a matter of conjecture as to what effect such attacks are likely to have on the progress of mobilisation and concentration of the armies concerned, as such conditions have not yet been tested. It is suggested, however, that although dislocation and casualties may be caused, no serious delay in mobilisation or concentration is likely to ensue, unless an army is singularly restricted as to its lines of communication, and the enemy may have been skilful or lucky enough to destroy some vital bottle-neck such as an important railway bridge over a wide river. The general effect of the threat from the air is likely to cause detrainment farther from the area of operations than has previously been thought desirable. Where the frontier is guarded on both sides by permanent defensive lines, their garrisons will be brought up to full strength in the early stages of mobilisation. As soon as safety from invasion is thus assured, the governments concerned will have to decide whether to pass their field army through their defences in order to achieve the rather barren object of occupying the no-man's-land between their own and the enemies' frontier defences, or to be satisfied with stalemate on the ground while the war is transferred to the air or the sea. In any case, it is clear that military operations under such conditions will be very restricted in character and are unlikely to have any decisive result. There is, however, always the chance that such defences can be turned by an advance through an allied or neutral State. Neutral States can sometimes be intimidated by a powerful nation into allowing the free passage of troops.

As it is obviously a waste of time to study further the stalemate that is almost certain to ensue if a permanent defensive line blocks the way of an army, the following passages deal with the case where the further advance is not impeded by strong artificial obstacles.

The advance of the armies will be covered in the first place by strong mobile mechanised forces,[1] consisting of armoured cars, tanks (probably for the most part of the faster and lighter types, though medium tanks will probably be included), lorry borne infantry, and mechanised artillery. The objectives of these mobile forces will almost certainly be natural obstacles likely to hold up the progress of mechanical transport. River lines (provided the bridges are destroyed) are the most serious obstacles to an army relying on M.T., but mountainous country and low-lying ground much intersected by water channels is likely to restrict the lines of advance and render them more liable to successful air attack. River obstacles in particular are formidable obstacles to modern armies, as the average weight and load of mechanical transport vehicles is considerably greater than that of horse transport vehicles, and if the normal bridges are destroyed the provision of the necessary number of sufficiently strong temporary bridges presents a considerable problem.

Generally speaking, however, the tactics of the mobile forces in the opening stages will probably not differ greatly from those normally adopted by the same forces when horsed. The seizure of successive lines of natural obstacles, on which the enemy could offer the most formidable resistance to the main forces which are following, is still likely to be the main object of the mobile forces at this stage of the campaign. As they will be covering a wide front, their dispersion should give them reasonable immunity from serious air attack, though the movement and concealment of the transport echelons will require care and skill if casualties from air attack are to be avoided.

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[1] The term mobile mechanised forces is used throughout to cover mobile divisions and motorised divisions. The organisation and composition of these is at present a matter of frequent change.

Meanwhile the advance of the main armies will have commenced. It is almost certain that columns of marching infantry and transport, covering many miles of continuous road space, are no longer practicable. On such columns even a moderately successful air attack would inflict considerable casualties, confusion, and delay. It is probable in the future that the approach march will be carried out mostly at night, the troops resting in dispersed and concealed bivouacs by day. Where, however, speed is important, fast-moving M.T., travelling either by single vehicles or in small groups, should be able to get a proportion of the infantry forward by day without undue danger from air action. The tendency during this phase will be for armies to advance on wider fronts than hitherto. It will be desirable for infantry divisions to have the use of two, three, or more roads rather than the one which in the past has been considered sufficient. Marching columns even at night are not immune from air attacks if illuminating flares are used, though the efficacy of such attacks has not yet been proved by war experience. It is, therefore, important that even at night, roads should not be congested by long slow-moving columns of infantry or transport.

There will probably be considerable fighting between the mobile forces of the advancing armies, but although one may obtain a definite superiority, it will eventually come up against forces too strong for its resources, or else be faced with a defended obstacle which it cannot tackle. It will then occupy the best positions available until these are taken over by the forward troops of the infantry divisions.

The problem of the further employment of the mobile forces then arises. They can be used in either of three ways :

(1) They can be withdrawn into reserve and husbanded for any opportunity that may be opened up by subsequent operations by the main forces.

(2) They can be utilised for an immediate turning movement against the enemy position, in the hope that a threat to his communications may force him to abandon that position.

(3) They can be concentrated on one flank and be used for an attack on the enemy's flank and rear in conjunction with a general attack by the infantry divisions on the enemy's position.

Courses (2) and (3) presupposes that there is ground on the enemy's flank that is suitable for operations by highly mobile forces. Modern armies cover vast frontages and often base one or both flanks on the sea, a neutral frontier, or a considerable natural obstacle. They will also probably carry out extensive destruction of communications on a flank that may offer opportunities for movement by mechanised forces.

On the presumption, however, that a wide turning movement by mechanised forces is not impossible owing to any of the above reasons, it is desirable to examine its difficulties and possibilities. As an operation on the map, or as part of the operations of the small forces available for peace exercises, the chances for outstanding success appear likely to outweigh the risks. But it is doubtful if the same would apply in real warfare. With the large forces engaged nowadays, it would be necessary for the mobile force to go wide in order to secure an unopposed passage, and to strike deep behind the enemy line in order to cut some vital link in his communications. Such an operation could hardly be completed within forty-eight hours, even allowing for the high rate of movement of such a force. Sooner or later the enemy's air force would be bound to locate the movement, and from that time forward, during the hours of daylight, the raiding forces would be subjected to continuous air attack. It could be protected to some extent by an escort of aircraft, but all the time during its advance it would be getting farther from its own aerodromes and nearer to those of the enemy. In order to have sufficient striking power to deal with minor opposition and to capture and destroy its objectives (probably important bottlenecks on the enemy communications such as railway or road bridges over rivers, railway junctions, etc.), it would require to move in fairly cohesive formation, thus rendering it more liable to casualties from air attack. The destruction of part of its petrol reserve might result in portions of the force being immobilised behind the enemy lines with no alternative except destruction or surrender. Supply by aircraft might mitigate this danger, but it can hardly be considered as reliable as supply by normal methods. Supply by aircraft may be interrupted at the most critical moment by enemy action or weather conditions.

Perhaps an even greater danger is the possibility that the enemy may be able to make a line of rapid demolitions or obstacles behind the mobile force, and thus cut some or all of its lines of retreat. It is usually impossible for such a force to detach many troops to protect its line of retirement, which necessarily traverse many miles of country. If the country is very open, and the force is not confined to roads, the danger is of course less. But where water lines or hilly country make movement off the road difficult for M.T., the danger is very real.

There can be little doubt that the risks attending such a movement are considerable, and should not be incurred unless the results are likely to have a decisive effect on operations. The destruction of important links in the communications behind an army may have a paralysing effect. On the other hand, the incursion of such a force with no definite objectives but a general mission to interfere with the enemy's rear services is unlikely to lead to decisive results. In cases where the enemy army is not of the first class, or has previously been severely handled, the risks of such an operation will be proportionately smaller. In any case, the risks will be considerably less and results probably greater if such a movement is carried out in conjunction with an attack by the infantry divisions rather than as a separate operation. In the former case, the enemy air forces will be fully employed over the main battlefield, and may have difficulty in detaching sufficient machines to keep the mobile force under persistent observation and attack. Fewer reserves will be available to oppose or attempt to cut off the mobile force. The enemy communications will be working at high pressure to serve the fighting troops, and any dislocation will have serious and possibly decisive effects on the operations as a whole.

If the more spectacular and perilous outflanking movement is rejected by the High Command, there should still be ample opportunity for the use of the mobile forces during a successful attack. The great majority of the fighting vehicles are proof against small-arm fire, and therefore can be used against much stronger opposition than would be possible for horsed mobile troops. It should no longer be necessary to wait for the complete demoralisation of the enemy defence before mobile troops can be used. As long as the infantry and heavy tanks have made a partial break in the enemy defensive system, a rapid advance through it by a mechanised mobile force may lead to an important success. It is probable that this use of the mobile forces will often lead to better results than the wide turning movement with its undoubted risks and dangers. However, like many tactical problems produced by modern armaments, the best use of the mobile forces after contact with the enemy can only be decided by actual war experience and the varying conditions of ground, enemy armament, and enemy morale.

CHAPTER IV

PREPARATIONS FOR THE ATTACK

As the infantry divisions take over the positions gained by the mobile forces, it is probable that further fighting resulting in local adjustments of front will take place. But so great is the defensive power of modern armies that it is doubtful if any considerable progress can be made in a purely encounter battle. It is necessary to concentrate the arms required for an offensive on a big scale, *i.e.* heavy tanks, heavy and medium artillery, suitable air formations, as well as infantry in a particular area or areas before a serious attack can be attempted. It is, of course, possible, however, that a commander will, during the approach march, decide to make his main effort along a particular line of advance. In that case he will direct his reserves both as regards men and machines towards his objective from the start, and an important attack can be prepared immediately the forward infantry pass through the mobile troops and gain contact with the enemy. The dangers of planning the main effort so far in advance are that the force is more or less committed to a particular line of attack before much can be known of the enemy's dispositions, and that there is great difficulty in keeping such a concentration secret in view of modern air reconnaissance. But large modern armies cover such wide fronts that unless some provisional decision is made as to the axis of the main attack before deployment takes place, the concentration of the necessary resources will take a considerable time. Generally speaking, the stronger an army is in comparison to its opponents, the more easily it can make plans well in advance and direct its main forces towards a particular area. The weaker army will usually be obliged to keep its reserves more or less centrally placed, ready to deal with any serious menace or to seize any opportunity presented by a false move by the other side. The planned advance was used by the Germans in 1914, when from the first the main weight of their armies was concentrated on the right flank. This fact remained secret much longer than would be possible in these days of intensive air reconnaissance. When, however, a false move was made, and the hastily collected allied reserves were able to launch a counter-offensive, the weakness of this type of advance was apparent. In an effort to make the offensive on the chosen line overwhelmingly strong, no proper reserves had been left for eventualities, and it was only the somewhat fortuitous arrival of fresh troops that enabled the Germans to stop their retreat on the Aisne.

Presuming that the commander has not committed the bulk of his force too rigidly to a particular line of advance, and considers that he is strong enough to take offensive action, he must now decide where and when to make his attack.

It is, of course, a platitude to say that the most important adjunct to a successful attack is surprise. The fact remains that nothing is more difficult than to launch a surprise attack on a big scale in modern war. Modern air reconnaissance and photography is extremely efficient, and it is unlikely that such air superiority can be gained on the whole front that no enemy aircraft dares to cross the opposing lines. It may be possible by concentrating air resources to prevent him reconnoitring the actual area where the preparations for the attack are taking place, but this is almost as good as telling him to expect trouble on that part of the front.

The natural instinct for a commander who has a strong force of tanks at his disposal is to select an area physically suitable for their use. But the enemy is certain to be watching for signs of coming attack in such areas, and will as certainly pay especial attention to their anti-tank defences. Unless the whole area of operations is suitable for tank tactics, the commander is faced with the alternative of selecting a somewhat obvious line of attack, or else operating on ground where his tanks will not be able to play the important rôle which is nowadays expected of them. To this extent it may be said that the tank has lessened the chance of inflicting surprise in modern war. The likely lines of attack are limited to those suitable to tank action.

In view of the difficulty of any advance on the modern battlefield unless supported by all possible means at a commander's disposal, it is probable that in most cases ground suitable for tank action will be selected, even if the chance of surprise has to be sacrificed to some extent. It is possible, however, that in some cases a commander may feel justified in keeping his tanks for subsequent operations, and attempt a surprise attack on ground unsuitable for tanks. In this case it may be hoped that the enemy small-arm fire can be kept within small limits by persistent bombing and machine gunning from the air, artillery fire, and the use of smoke and possibly gas. It is unlikely, however, that this type of attack would have much chance of success unless the defences were of a very temporary character, were thinly held, or occupied by troops of doubtful staunchness.

Tanks can usually be concentrated in large numbers within reach of a given area without much danger of discovery provided they move by night, lie up in dispersed and concealed bivouacs by day, and avoid making tracks across country. By virtue of their range of action, large air forces can usually be collected at convenient aerodromes and landing grounds without giving more than a vague indication of the area of impending attack. Infantry can be brought up by M.T. and night march in reasonably large numbers within a short period of their probable employment. A large concentration of artillery is the most difficult to conceal. Guns have to be in position fairly close behind the attacking troops before the attack is launched, and in spite of the great advance in predicted fire methods (see Appendix) they require some hours of technical preparation before they can give accurate fire. It is therefore (apart from questions of road congestion) not possible to bring artillery into position at the last minute to support an attack on a large scale. In addition, the amount of ammunition required to carry out even a moderate bombardment is considerable. If it is hoped to inflict surprise, the concentration of guns and ammunition will have to be limited, and the deficiency made good by intensive action by low-flying aircraft supporting the attack.

Having selected the area of attack, the commander has to decide when to attack. The dominating factor will, of course, be the time required to concentrate the troops, tanks, guns, and aircraft in the area selected, and to enable the formation and unit commanders to carry out the necessary reconnaissance. But it must be remembered that every day during which an enemy occupies a defensive position he will be adding to its strength, and therefore making more support necessary for any attack on it. A well-equipped modern force can dig and wire a considerable area even within twenty-four hours, and within a week a very formidable defensive system can be evolved.

Having decided on the day for launching his attack, the commander must decide on the conditions of light most likely to lead to success. During the later stages of the Great War, the attack at first light became almost a convention. The reasons were not far to seek. With the forces so closely interlocked it was impossible to concentrate the attacking troops near enough to the front line except under cover of darkness and equally impossible to keep them concealed after light. Night attacks were, of course, possible, but as tanks could not be used at night, and artillery bombardments, however intense, could not be relied on to cut more than a limited number of lanes (not easy to find in the dark) in the formidable wire defences, this form of attack was not often attempted on a large scale. However, some striking local successes were gained by night attacks, particularly during the more open fighting of 1918, when wire defences were less formidable.

Although it is probable that during the opening phases of a campaign, forces will not be so closely interlocked as during the trench warfare period of the Great War, it will always be difficult to assemble by day any large force, except in very close country, without rendering them liable to discovery and attack from the air. It is, therefore, probable that a great proportion of the preparatory movement of troops, guns, and armoured fighting vehicles, including the actual assembly and deployment for attack, will take place under cover of darkness.

It has been assumed in many quarters that the power of the modern defence will cause the night attack to become increasingly frequent and important. The night attack has, however, certain definite limitations. It has been fully proved that in war, owing to difficulties of control and intercommunication, it is impossible to manœuvre even the best-trained troops at night under close-range fire, and that all that is possible under these conditions is a comparatively short advance without change of direction against clearly recognisable objectives. Any attempt at manœuvre or a lengthy advance under fire at night is likely to lead to considerable disorganisation and loss of assaulting power. An additional disadvantage to the night attack is that, for obvious reasons, the co-operation of tanks and aircraft is not possible.

It may, however, often be necessary and desirable to make a limited advance at night as a preparatory measure to the main attack with the object of capturing a tank obstacle, an area that is known to have particularly strong anti-tank defences, or which owing to exceptionally open approaches it is undesirable to attack by day. Such attacks should, against first-class troops, be supported by the maximum intensity of artillery and mortar fire. While the silent surprise attack with the bayonet may have some chance of success against second-rate or badly demoralised troops, it is most unlikely to succeed against troops that take the most elementary precautions against surprise; and if such an attack fails the casualties are liable to be very heavy.

Although it lessens the chance of complete surprise, because defending troops always expect attack at this hour, the dawn attack offers so many advantages that it is probable that in the future, as in the past, it will be selected as a rule for the launching of the main attack. It gives the full hours of darkness for assembling and deploying the attacking troops and armoured fighting vehicles, and the full hours of daylight for exploiting any success gained before the inevitable pause in operations which almost invariably follows the coming of night during a battle.

CHAPTER V

THE RÔLE OF THE OFFENSIVE ARMS IN THE ATTACK

THE actual assault on the enemy positions will normally be carried out by infantry and heavy tanks, under cover of a bombardment by all available types of artillery and mortars, and in the case of armies so equipped, supported by intensive attacks by low-flying aircraft.

During the middle period of the Great War most attacks were preceded by bombardments lasting several days. These were considered necessary owing to the semi-permanent nature of the defences and the strength and extent of the barbed wire obstacles. In the event, these bombardments often failed to destroy the wire and entrenchments, or even to impair seriously the morale of the defenders. In addition, they precluded any chance of surprise, and by destruction of all communications made any rapid exploitation of success impossible. It appears probable that the weak points in this type of tactics are now generally recognised, and the long-drawn-out and deliberate bombardment is probably a thing of the past. It is generally agreed that a short and very intense bombardment gives the best chance of success. This is liable to have a temporarily stunning effect on the defence, and if supplemented or followed by intensive air action the automatic and anti-tank fire of the defence may be reduced to sufficiently small proportions to give the assault a chance of success. Wire cutting must be left to the tanks. An admixture of smoke in the bombardment will, of course, make aimed fire for the defence more difficult.

The actual methods of fire by the artillery in support of the attack have altered little during the last twenty years. They can be classified in three broad types as support by observation, by concentrations, and by barrage fire. Support by observation, which covers all fire put down by the artillery against targets discovered or suspected by forward troops and observers during the actual advance, has always suffered from two disabilities. The first is the difficulty of discovering the exact locality from which fire is being directed on the advance, and the second is the difficulty of getting this information when obtained quickly from the forward troops to the guns. The first difficulty is likely to be intensified in future fighting, as the great increase in light automatic weapons means that a considerable volume of fire can be produced by a small number of easily concealed weapons which require few personnel to serve them. The second difficulty is likely to be eased by the use of wireless communication between forward observers and the guns. But even with this advantage this type of support can never be relied on to deal with anything but temporary or scattered resistance such as is likely to be met with during the later stages of a pursuit, or the early stages of an advanced guard action.

Support by concentrations is a wide term used to describe all fire (barrage fire and counter-battery fire excepted) planned before an attack to support that attack. It consists of bombardments directed on to known or suspected centres of enemy resistance. For full success, it is necessary that the enemy's defensive system should be known accurately. This information can only be obtained by thorough observation by artillery observers, the action of the forward troops, comprehensive air photography, and a well-organised intelligence system. The collection and co-ordination of the necessary information is likely to take a considerable time if the enemy's defensive organisation is well advanced or the country offers good opportunities for concealment. It will obviously be undesirable in many cases to wait for all the required information, and in this case arrangements must be made to cover with concentrations not only all localities which the enemy is known to be holding, but also to deal with those from which resistance is likely to develop. Such a method is to some extent a gamble, but in open country, where concealment is difficult, it may reasonably be expected to deal with the bulk of the enemy centres of resistance. But where the type of country makes concealment easy it is certain that many enemy posts will be untouched by this type of support, and it will usually be necessary to have a proportion of artillery in reserve ready to deal with unlocated resistance which the infantry and tanks may be unable to overcome.

The use of a proportion of smoke shell in concentrations may be looked on as almost normal in modern war. Smoke shell has now reached a high state of efficiency, and except in a high wind a small number of shells can obscure a considerable area. Smoke screens put down on the flank of an attack, or on likely artillery observation areas, may often prove invaluable aids to the attack. Within their somewhat limited range, mortars are also efficient smoke-producing weapons. Gas shell, if its use has been authorised and if it can be used in such a manner as not to interfere with the subsequent advance, may also be used in concentrations.

Barrage fire, which as is generally known, is a curtain of fire put down progressively on a timed programme in front of the advancing tanks and infantry, has the advantage that any enemy defensive posts, however well concealed, that lie in the path of the barrage will receive their share of fire. This type of fire therefore reduces the main danger to the attack, which is the unlocated and unsubdued automatic weapon or anti-tank weapon. Provided that sufficient guns and ammunition can be made available, a powerful barrage on a broad front forms the most effective form of artillery support yet evolved. But the collection of the required guns and ammunition on a sufficient scale is a real difficulty. In order to keep transport columns within reasonable limits, the amount of artillery ammunition that can be carried in front of railhead is strictly limited, and for barrages on a big scale, the collection of the necessary ammunition is likely to cause a delay of some days. It may often, however, be possible, even in mobile operations, to use barrage fire on a limited portion of the front of attack to help infantry and tanks deal with a particularly difficult or important sector, while concentrations are used where resistance is likely to be less formidable.

Predicted methods of fire[1] may be used for putting down either concentrations or barrages. The tactical effect of this advance in artillery technique is really important. Not only does it enable a large number of guns to open accurate fire either without registration or (as is more usual) after registration by a strictly limited proportion of the guns available, but it also makes it possible for guns to move into position under cover of darkness and be ready to open fire at once, provided that the necessary preparatory survey work has been carried out before dark. It is obvious that this development has rendered the arrangement of artillery support for a surprise attack very much easier.

Counter-battery work is still the main task of the medium and heavy artillery, though it is likely in the future that this task may be implemented by low-flying aircraft attacks.

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[1] A short explanation of predicted methods of fire is given in an Appendix.

The changes in tendencies and methods in artillery tactics during the last twenty years may be summarised as follows :

(*a*) A tendency to favour the short, intensive bombardment in preference to more deliberate methods.

(*b*) The increasing efficiency of smoke shell and its importance as an aid to infantry and tank tactics.

(*c*) The increasing use of predicted methods in order to obtain the maximum volume of fire with the minimum of registration.

(*d*) The use of wireless telephony for communication between the forward observing officers and the guns.

Support by low-flying aircraft is a comparatively new factor in warfare, but judging by the results obtained by the Nationalists in Spain, and by our own air force on the North-West Frontier of India and Palestine (admittedly against a badly armed enemy), it is likely to become increasingly important. The method at present used in Spain is that successive waves of aircraft dive on the defensive positions, dropping a shower of light bombs and raking the area with machine-gun fire. Before the effect of this action has had time to wear off, the positions are assaulted by the infantry. It is obvious that careful timing and co-operation between infantry and aircraft is necessary. It is doubtful if this form of support could be carried out simultaneously with an artillery bombardment as the aircraft might suffer casualties from shells fired by their own artillery. It would probably be used directly following the artillery bombardment, or on another portion of the front to be assaulted.

Judging from accounts from Spain, this form of support has proved extremely effective against unentrenched or lightly entrenched troops; against troops who have had ample time to dig in, the results have been less striking. But there seems little doubt that as a method of helping the attack against the great power of modern defensive weapons it has great possibilities, and is certain to be adopted as a normal method of support by some of the most powerful continental armies. Just as the potentialities of the machine gun and barbed wire in defence were clearly indicated by the Russo-Japanese War, this new factor in warfare stands out as the principal tactical lesson of the Spanish Civil War. It is a lesson that certainly should not be ignored by those who direct the policy of any army.

As regards tank tactics in co-operation with the infantry attack, it is difficult to discern any startling development in recent years. The tank has, of course, improved considerably in design and reliability, but it is no longer a surprise weapon, and will have to face various weapons specially designed to deal with it. If speed is sacrificed it is doubtless possible to produce a tank that is so heavily armoured that the greater part of it is immune to most anti-tank weapons, but the track always forms an Achilles heel which is easily damaged and almost impossible to protect. As a result of counter measures, it is unlikely that tanks will normally be able to overrun a well-organised position without sacrificing a considerable proportion of their number, and it is therefore likely that for effective action very much larger numbers will be required in the future than has been considered sufficient in the past. Not only will large numbers be required to break the forward defences, but if it is intended to carry the attack to any depth, a considerable mass of tanks will be required in reserve, as tanks once used require some time to re-organise and refit; in addition, the strain on the crews during battle is considerable, and they cannot be kept in action continuously for long periods without loss of efficiency.

While it cannot win battles alone and requires considerable support from the other arms in order to deal with its own special enemies, it appears probable that the tank will be the dominating offensive factor in future wars, and that offensive tactics will be based on the mass attack by tanks. It is difficult to foresee any attack on a big scale succeeding against a first-class army unless heavily supported by tanks.

The great increase in the number, efficiency, and reliability of the light automatic has to some extent limited the rôle of the heavy machine gun. It can still, however, produce a much heavier volume of fire than any other small-arm weapon. It has always had considerable limitations as a supporting weapon in the attack owing to its flat trajectory and its inability to harm troops behind bullet-proof cover. It has, however, a considerable neutralising value, and when there are insufficient artillery and mortars available to deal adequately with all targets, machine-gun support for an attack may still prove of value. The most important rôle of the heavy machine gun in the attack is likely, however, to be consolidation of ground gained and protection of the flanks of an attack against counter-attack. Against infantry advancing across the open the heavy machine gun is still the most powerful weapon available, and the consolidation rôle (which is really a defensive one) gives full scope for its fire power.

It is now generally recognised that infantry cannot make progress against any organised opposition unless tank, artillery, or air support is sufficient to reduce enemy automatic fire to a negligible volume. In all modern armies, infantry tactics are based on a small group armed with a light automatic weapon and grenade throwing weapons. Provided that sufficient fire support is available to make advance possible, these groups work forward and deal with any enemy posts that may still be holding out by enfilade fire from their automatic weapons and light mortars. Heavier types of mortar are available close behind for dealing quickly with more obstinate opposition.

Although these tactics resemble closely those adopted by the German army in 1918, this doctrine forms a radical change of policy for the British army, which has for so many years based its tactics on the rifleman. It is now recognised that the rifle can no longer be a serious factor in a modern battle, which will be decided by weapons that can produce greater fire power.

A new factor from the British army point of view is the addition to the infantry battalion of armoured tracked vehicles carrying a small crew and a light automatic. The principle is undoubtedly sound, as it is always better to present a man behind armour to enemy bullets rather than a man not so protected. These vehicles will undoubtedly add to the offensive fire of the infantry, and it appears possible that in the future their numbers will be increased, thus reducing still further the number of troops unprotected by armour whom it will be necessary to expose to enemy bullets during the attack.

CHAPTER VI

THE DEFENCE

THE main elements in the defence remain much the same now as they did twenty years ago. Entrenchments, automatic small-arm weapons, and barbed wire still form a combination which presents a formidable problem to any attack. To these must be added a great increase in the number and efficiency of anti-tank weapons and the possible defensive use of gas.

The circumstances under which a force adopts a defensive attitude vary greatly, but can be roughly divided into two categories: the defensive position deliberately occupied as a matter of policy, and the defensive position occupied from force of circumstances, such as the failure or breaking off of an offensive. In the former case, the commander will usually have considerable choice of ground; in the latter, he will have to make the best use of the ground immediately available.

When a commander has a free hand in the choice of ground on which he proposes to fight a defensive battle, the factors which are most likely to affect his choice are as follows:

(*a*) Frontal protection by natural obstacles against tank attack.
(*b*) Flank protection by natural obstacles against a turning movement (with particular reference to a turning movement by a mobile mechanised force).

(*c*) Concealment for his automatic and anti-tank weapons against artillery fire and low-flying air attacks.
(*d*) Field of fire for his automatic weapons.
(*e*) Observation for his artillery observers.

If a position can be found that fulfils the above requirements it should, if held in depth by well-equipped troops of good morale, be able to withstand the assaults of a much superior force. A commander will, however, be limited to some extent by strategical necessities in his choice of a defensive position, and the ideal type of ground will seldom be available. Gently rolling slopes, well provided with natural cover (but not so heavily wooded as to limit unduly the field of fire of automatic weapons), with a water obstacle capable of stopping tanks as the foremost defence, constitute an excellent type of defensive position, especially if the ground on the enemy side of the water obstacle does not offer good facilities for concealing preparations for an attack.

It will, however, often be impossible to find ground that fulfils all the requirements of a defensive position, and in that case the commander must decide which is the dominating factor that will govern his choice. It is probable that against an army which can deploy a formidable force of armoured fighting vehicles a commander will select a position that provides the maximum anti-tank defence frontally, and which cannot easily be outflanked by mobile forces, and it is certain that under these circumstances a force holding a well-wired and well-dug defensive position should be very difficult to dislodge, unless subjected to an unusually fierce bombardment from artillery and low-flying aircraft. Even in the event of enemy penetration, if the position is held in sufficient depth, it should usually be possible to limit the loss of ground and prevent anything in the way of a complete rupture in the defensive organisation.

In the case of a large force covering a wide frontage, it will, of course, often be impossible to ensure that natural anti-tank obstacles cover the whole front, although by adopting a river line as the forward defence it may be possible to present such an obstacle to the enemy along a considerable frontage. Where the front is open to tank attack, it may be possible to remedy the weakness by digging tank traps or the laying of anti-tank mines. The digging of an obstacle capable of trapping a tank takes a considerable amount of time and labour however, and would only be possible on a large scale in a semi-permanent defensive position. The use of anti-tank mines is a comparatively new factor in war. Their efficacy has yet to be proved, but there appears little doubt that they will prove a serious menace to tanks. If, however, much of the position is vulnerable to tank attack it may be difficult to produce them in sufficient numbers to cover more than a proportion of the possible tank approaches.

While tanks are undoubtedly the most formidable menace to the defence in modern war, counter measures to artillery bombardment, low-flying air attack, and infantry attack must, of course, also be taken into consideration. It will often be found that positions that offer the best observation and field of fire for the defending artillery and automatic weapons offer the fewest opportunities for concealment. It naturally follows that if observation is available for a considerable distance on to the lines of approach to the position, the enemy will have equal opportunities of studying the forward defences occupied. While the art of camouflage has been much studied and practised of recent years, it is doubtful if it is possible to screen defences from discovery by combined ground or air observation for long, unless the nature of the ground is exceptionally favourable. Defences on forward slopes, which give the best observation and field of fire, are in particular difficult to conceal. In deciding whether to hold a forward slope, or a position farther back, which while giving less scope for observation gives better opportunities for concealment, the armament of the enemy will often be the deciding factor. If the enemy is unlikely to deploy sufficient artillery and aircraft to deal effectively with the forward defences, even if these are difficult to conceal, it may be advisable to base the defences on the best ground for observation and field of fire. If, however, the artillery fire and air attack are likely to be formidable, it will usually be wisest to sacrifice field of fire for concealment.

In many cases it may be found the best policy to hold a position offering the best observation during the early stages of the defence, when the enemy has not had an opportunity of concentrating a great volume of supporting fire. As his supporting fire becomes more menacing, the forward position can be abandoned, and a prepared and well-concealed position in rear occupied. Generally speaking, the modern tendency is to sacrifice observation for concealment.

A method of foiling the attack which is likely to become increasingly important is that exploited with great success by General Gouraud against the German attack in the Rheims area in 1918. While continuing to hold his forward defences with a skeleton force, he withdrew the bulk of his troops and weapons to defences considerable in rear. The German attack having spent much energy and ammunition on the capture of the forward defences, and having suffered the disorganisation inevitable after even a successful attack, were met by the maximum resistance and defensive fire as soon as they came within range of the strongly held French rear positions. As a result the attack failed disastrously.

It is difficult to see an answer to these defensive tactics provided that the defence can afford to give up the necessary ground. It is impossible without a full dress attack to find out if strongly-wired forward defences are held by only a skeleton force or by their normal garrisons.

These tactics are, however, only feasible in a well-organised defensive position. The withdrawal of the skeleton force defending the forward defences requires careful organisation, as it is necessary for them to retire through arranged gaps in the defensive fire from the positions in rear. Communication trenches form very suitable lines of retirement in such a situation. Without this organisation and the necessary rearward communications, the withdrawal of the skeleton force might result in the masking of the defensive fire at a critical stage in the battle.

The British defensive policy favours a more or less continuous line of forward defended posts with further lines of defence in rear. Some continental nations prefer a more elastic system of posts in depth with considerable gaps in between. The linear system has the advantage of simplicity and makes it more difficult for the enemy to outflank and capture separate posts in succession. On the other hand, it probably presents an easier target to the enemy artillery. In either case the backbone of the defence is the cross fire of small-arm automatic weapons, which can use either aimed fire or fire on fixed lines if visibility is obscured by darkness or smoke.

Whether, however, the linear or more scattered system of defence is adopted, it is recognised that great depth is necessary in any defensive system in modern war. The attacking commander can assemble his maximum offensive resources in a given area, while the resources of the defence are bound to be more or less dispersed until the area of attack is known with certainty. As a result it is seldom possible to prevent portions of the forward defences being overpowered. If, however, the penetration can be slowed up and localised by strongly held defences in rear, the arrival of reserves and inevitable loss of momentum in the attack should prevent any more serious result than a limited loss of ground. If, however, the defensive system lacks depth, the enemy may force a gap through which he can pour mechanised forces. Once this situation has arisen, irreparable disaster may result.

It is probable that in the future one of the chief functions of the machine-gun battalions is to give the necessary fire power in depth to the defence. They can produce a great volume of accurate and sustained fire ; they are particularly suitable for firing on fixed lines when visibility is obscured ; they are easy to conceal.

If gas is being used, as soon as the commander of the defending force suspects an attack is being prepared in a certain sector, he will take steps as far as his resources permit to put down gas on all likely assembly positions, forming-up places, and lines of advance, and artillery areas likely to be used by the attacking force. This can be done either by artillery or aircraft. He may also decide, in order to form an additional obstacle, to evacuate his most forward defences and before doing so to drench them with gas from cylinders.

During the Great War it was almost a convention amongst all armies that any loss of ground must be recovered at all costs. This policy often resulted in hasty and ill-prepared counter-attacks which usually failed with heavy casualties. These counter-attacks, besides proving useless for their purpose, depleted the troops required to hold the reserve positions and thus actually made a further enemy advance easier.

It is now generally recognised that it is the first duty of reserves to defend the reserve positions and thus present to any enemy forces, who may have broken through the forward defences, an organised static resistance. If these reserve positions are well sited and strongly held, the attacking force will have difficulty in maintaining the momentum of its advance, and will be forced to pause in order to reorganise his assaulting troops and supporting fire. As soon as this occurs the defending commander can decide whether to try to regain the lost ground by a carefully prepared counter-attack, supported by tanks, artillery, and low-flying aircraft, or to reorganise his defences so as to prevent any further enemy advance from the lost positions. Unless the ground lost is of great importance it will often be advisable to allow the enemy to keep it. Even a successful counter-attack is liable to be costly in casualties, as it will be expected by the enemy, who will naturally be strong in fire resources in an area where he is attacking. It is possible that the enemy advance may have led him into a salient. In that case it may be possible by concentrating fire on that area to force him to evacuate it, or at any rate to inflict heavy casualties, without incurring the risks of a counter-attack.

A quick and effective form of counter-attack may be made by reserves of suitable aircraft if these are available. This method was used with complete success by the Republicans in Spain to stop the Italian break through in the Guadalajara area in March 1937. It was used with equal success by the Nationalists to bring to a halt the Republican counter-offensive across the River Ebro in 1938. It is possible, however, that the opposing air force may make such action difficult by intensive attacks on all aerodromes within reach, and by concentrating an overwhelming force of aircraft in the neighbourhood of the attack.

It is not, of course, possible to win a campaign by a purely passive defence, however successful. But it will often be found that it is better to husband resources for a counter-offensive in another area rather than expend them on counter-attacks. Heavy casualties have often been incurred in the past to regain ground that was later to prove of little value to either side. Such counter-attacks, undertaken for the purpose of restoring prestige rather than for a true military object, are now recognised as being rarely worth the risks involved.

It may be said that modern developments have modified defensive policy to the following extent:

(1) Positions will primarily be selected from the point of view of anti-tank defence. Whenever possible, flanks will rest on obstacles that will make outflanking movements by mechanised forces difficult.
(2) Concealment of the defensive organisation is now generally considered more important than a wide field of observation and fire.
(3) Depth in defence must be maintained by strong reserves holding well-organised positions.
(4) Counter-attack should not be undertaken by troops required to man the reserve positions until the situation has become thoroughly stabilised.
(5) It may often be better to accept a loss of ground rather than incur heavy casualties in counter-attacks.
(6) Reserves of aircraft may under certain conditions deliver an effective counter-attack.

CHAPTER VII

THE WITHDRAWAL

THERE can be little doubt that modern developments have made it comparatively easy for an army to carry out a planned withdrawal even against greatly superior forces, provided that an unbroken front can be maintained. The chief factors which have produced this situation are the numbers and efficiency of the automatic weapons with which nowadays all armies are provided, and the comparative ease with which the mechanical vehicles on which all armies are dependent for offensive power and supply can be delayed by the destruction of communications.

Automatic weapons are easy to conceal and can produce a great volume of fire in proportion to their numbers. Infantry unsupported can seldom attack a position which contains any number of them with any hope of success. The arrangement of the necessary support by tanks, artillery, and low-flying aircraft takes time. By the time that the necessary arrangements have been completed, the enemy will probably have gained the necessary respite and be prepared to slip away to his next position. In this case the attack will have wasted much energy and will have failed to inflict any serious loss on the delaying troops.

The destruction of communications, except in the most open and waterless types of country, has a paralysing effect on a modern army. If the bridges over a water obstacle which lies across the line of advance can be destroyed, a considerable delay in the pursuit is bound to ensue. All modern armies carry bridging material, and the technique of rapid bridge building is being constantly improved. But it is obviously impossible to carry more than a limited amount of bridging material, while the time required to erect a bridge capable of taking even medium-weight mechanical vehicles cannot be reduced below a certain limit, even by the use of the most modern material and the most skilled labour. Even where water obstacles are not available, the cratering of roads on a big scale can have a considerable delaying effect, particularly if the craters are made where it is difficult to find an alternative route. While most vehicles actually accompany the fighting troops in action are tracked and have a fair cross-country performance, nearly all transport is wheeled and can seldom make much progress off a road or track. No force can carry out a vigorous pursuit for long unless its transport can keep up with it. Since the discovery of modern explosives, demolitions have always been easy to effect. By the latest methods and the use of power tools they can be carried out even more quickly and effectively.

If gas can be used, it constitutes an important delaying factor. While it does not definitely stop an advance it can be relied on to slow it up. Troops passing through a contaminated area are forced to take certain precautions both before and after. These precautions cause delay and lessen mobility. Troops in M.T., however, although not entirely immune from contamination by gas, are not likely to be so long delayed as dismounted men. Gas can be freely used by a withdrawing force. It can be distributed by gas shell, or from the air, on ground already evacuated, or by cylinders manipulated by retiring ground troops.

While delaying tactics are easy in theory, in practice there are certain inherent dangers in any retirement. If there is suitable country on either flank it may be possible for the pursuing force to make a wide outflanking movement with a mobile mechanised force. This may destroy communications in rear of the retreating army. If such action is possible it will be necessary to keep considerable forces in reserve to meet such a threat or else carry out extensive demolitions to protect the flank or flanks. These precautionary measures may overstrain the resources of the retreating army, and leave insufficient forces to maintain an unbroken front.

While an army whose fighting spirit is unimpaired and whose flanks are well protected has, as a rule, little to fear when carrying out a retirement, the case is different when the troops are in any way shaken or demoralised. In this case, however carefully the retirement may be planned, difficulties and dangers may occur. Troops may abandon important positions before they are seriously attacked, thus exposing the flanks of other positions. In this case, a dangerous gap in the front may result, which can only be rectified by a premature general retirement. A succession of such incidents may lead to general confusion and demoralisation. This danger will be accentuated if the enemy uses armoured fighting vehicles with vigour, to take full advantages of any favourable opportunities offered to him.

Another danger in the planned retirement is that if any confusion occurs some of the prepared demolitions may not be exploded by the retiring troops. This has occurred in the past with disastrous consequences. Failure to close one or more important line of advance may result in the hasty abandonment of a carefully prepared defensive line and upset all the plans of the commander who is arranging the retirement.

If the pursuing force has established a considerable air superiority and the lines of retreat converge on vulnerable targets such as bridges or mountain roads, a difficult and dangerous situation may arise. By intensive bombing and machine gunning he may render certain lines of retreat impassable. This will lead to congestion, delay, and disorganisation (in addition to the actual casualties inflicted by air attack), and may enable his ground forces to break through or outflank the retreating army. The protection of vulnerable points on the line of retreat by strong anti-aircraft formations and aircraft is of vital importance.

While the difficulties and dangers of a retirement cannot be entirely eliminated, it may be said that the delaying power of the numerous automatic weapons with which all modern armies are provided, and the comparative ease with which demolitions on a large scale can be effected by modern equipment, have made it easier to carry out a planned retirement, provided that the retiring troops are in a fit state to make the best use of these factors. These advantages may, however, be nullified if the pursuing force has established a marked superiority in the air, and has sufficiently powerful air resources to carry out persistent attacks on the retreating force. In this case such demoralisation may occur that a planned and orderly withdrawal may be no longer possible. Under such circumstances the armoured fighting vehicles of the pursuing army may find an easy prey.

APPENDIX

A SHORT NON-TECHNICAL EXPLANATION OF ARTILLERY-PREDICTED SHOOTING

PREDICTED shooting is based on a 1/25,000 gridded map. This is sufficiently large scale to give accurate results by map shooting. A larger scale map, of course, gives even better results.

If a reliable 1/25,000 map is available the gun positions can be accurately fixed on the map (probably by pacing on a compass bearing from a feature shown on the map). Then any target that is marked on the map can be engaged by calculation without registration (ranging by observation of fire).

If a peace-time 1/25,000 map is not available, it is the duty of the Survey Coys. R.E. to construct such a map of the area of operations. This map is called the *permanent grid.*

It is, however, obvious that the making of such a map takes a considerable time, and artillery will often have to operate without such help. For instance, during an advance the survey necessary to construct such a map is bound to lag behind the formations engaged with the enemy. In such circumstances, artillery officers are trained to make a *temporary grid.*

This is a 1/25,000 enlargement of the smaller-scale map in use. The position of one sub-unit is fixed on this enlargement as accurately as is feasible and then the *relative* positions of other sub-units either already in position or as they come into position are also fixed on the temporary grid by survey methods. This relative fixing of position is generally called " tying on," although this is not an official expression.

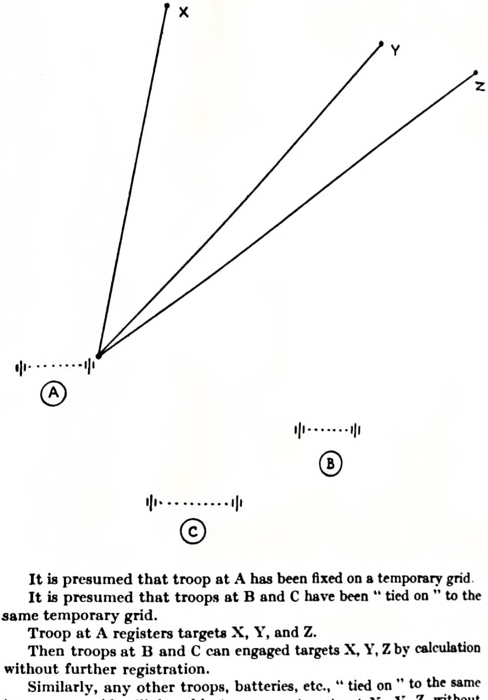
There are no limits except time and space to the number of units or sub-units that can be tied on to the same temporary grid. But as survey over a distance of ground takes time, it is usual if the area is large for each group of artillery units to have its own temporary grid.

As soon as a permanent grid becomes available it supersedes all temporary grids. It must be remembered that temporary grids are only relatively accurate, *i.e.* gun positions, etc., are accurate as regards each other.

If a target is registered by any sub-unit it can be engaged by calculation (without registration) by any other sub-unit or unit fixed on the same grid (either permanent or temporary). It will thus be seen that a large volume of fire may be brought to bear on certain targets with a minimum of registration. One troop can carry out the registration for a whole regiment or even larger force of artillery, the other guns of which can remain silent. It is thus possible to conceal from the enemy the fact that a large number of guns have concentrated in a certain area to support an attack, and yet for these guns to give the required support when needed.

It may be possible under certain conditions to engage targets without any registration when no permanent grid of the enemy position is available. In this case it is necessary to carry the survey through to the required targets. For this purpose it is necessary to take cross bearings on these targets. It may, however, be difficult to find suitable observation posts for this purpose, and in any case such a procedure will usually take time. It is also possible that the enemy may realise that an active survey of his positions is being carried out. In this case the advantage of surprise will be lost.

Gun positions can be fixed by survey by day (on either a permanent or temporary grid) and pegged. The actual guns can be brought into position on the pegs by night. Guns can then be fired by calculation on any target already fixed on the grid by survey or registration. Adequate artillery support for a dawn or pre-dawn surprise attack can thus be obtained.



It is presumed that troop at A has been fixed on a temporary grid.

It is presumed that troops at B and C have been " tied on " to the same temporary grid.

Troop at A registers targets X, Y, and Z.

Then troops at B and C can engaged targets X, Y, Z by calculation without further registration.

Similarly, any other troops, batteries, etc., " tied on " to the same temporary grid will be able to engage targets at X, Y, Z without registration.